



# Presence of *Ranzania laevis* (Pennant, 1776) in Iskenderun Bay, Turkey

Deniz Ergüden<sup>1</sup> · Mevlüt Gürlek<sup>1</sup> · Sibel Alagöz Ergüden<sup>2</sup> · Deniz Ayas<sup>3</sup> · Ayhan Altun<sup>1</sup>

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## Abstract

Two specimens of slender sunfish *R. laevis* were recorded from two locations in Iskenderun Bay at depths between 0 and 24 m. The first specimen, a female, was collected via purse seine net during a benthic survey carried out in Iskenderun coast on April 2016, and the other specimen, a male, was caught at the sea surface by gill net from the Payas coast on May 2018. The fishes were 565 mm and 375 mm in total length (TL) and 4450 g and 1750 g total weight (TW), respectively. Morphometric measurements and meristic counts of the fishes are detailed and presented in this paper. This is the first substantiated confirmation of *Ranzania laevis* from the Northeastern Mediterranean Sea.

**Keywords** Slender sunfish · Molidae · Northeastern Mediterranean · Turkish waters

## Introduction

The slender sunfish, *Ranzania laevis* belongs to the Molidae family that is represented by *Ranzania* genus (Abdul Malak et al. 2011; Froese and Pauly 2018). The slender sunfish is an oceanic, epipelagic (Froese and Pauly 2018), and generally solitary species (Scott 1995). The slender sunfish *R. laevis* is a tropical and cosmopolitan fish species and circumglobally distributed in tropical and subtropical zones through to Western Atlantic, Eastern Atlantic, Eastern Pacific and Western Pacific (Eschmeyer et al. 1983; Froese and Pauly 2018). This species is usually found at depths ranging between 1 and 140 m (Mundy 2005), and its maximum length can reach up to 100 cm (Claro 1994). This species commonly feeds on small fishes, crustaceans, squid, and seagrass (Heemstra 1986; Smith et al. 2010; Nyegaard et al. 2017).

Over the last three decades, the occurrence of the slender sunfish was reported from Adriatic Sea (Jardas and Knezevic 1983; Dulcic et al. 2007), Libyan waters in the Southern Mediterranean (Elbaraasi and Elsalini 2010), coastal waters of Oman and Iraqi waters of the Arabian Gulf (Jawad et al. 2010, 2011), and in the Red Sea, Hurghada coast, Egypt (Abu El-Regal and El-Moselhy 2013). Recently, *R. laevis* species has been reported in the Arabian Sea, off Mumbai coast, North-West Coast of India (Purushottama et al. 2014).

Bilecenoglu et al. (2002 and 2014) have included *R. laevis* in marine fishes of Turkey in their checklist by cross-referring more than three-decade-old reports of Whitehead et al. (1984–1986) and Fischer et al. (1987). Their reports mentioned the presence of the species in Northeastern Mediterranean Sea, Turkey. However, they have neither given any specific location nor any detailed information about the fish. Therefore, the slender sunfish is considered rare and the presence of it needed confirmation in the Mediterranean coast of Turkey. The rarity was also confirmed by the local fishermen that they have never seen this fish before (personal communication). This report, hence, is a very important report since it is the first substantiated confirmation of this species with detailed information about its presence in Turkish waters in the Northeastern Mediterranean Sea. The occurrence of this species in Iskenderun Bay substantiated with

✉ Deniz Ergüden  
derguden@gmail.com; deniz.erguden@iste.edu.tr

<sup>1</sup> Faculty of Marine Science and Technology, University of Iskenderun Technical, Iskenderun, Hatay, Turkey

<sup>2</sup> Vocational School of Imamoglu, University of Cukurova, Imamoglu, Adana, Turkey

<sup>3</sup> Faculty of Fisheries, University of Mersin, Mersin, Turkey

morphological data which was compared with previous records about the species.

## Materials and Methods

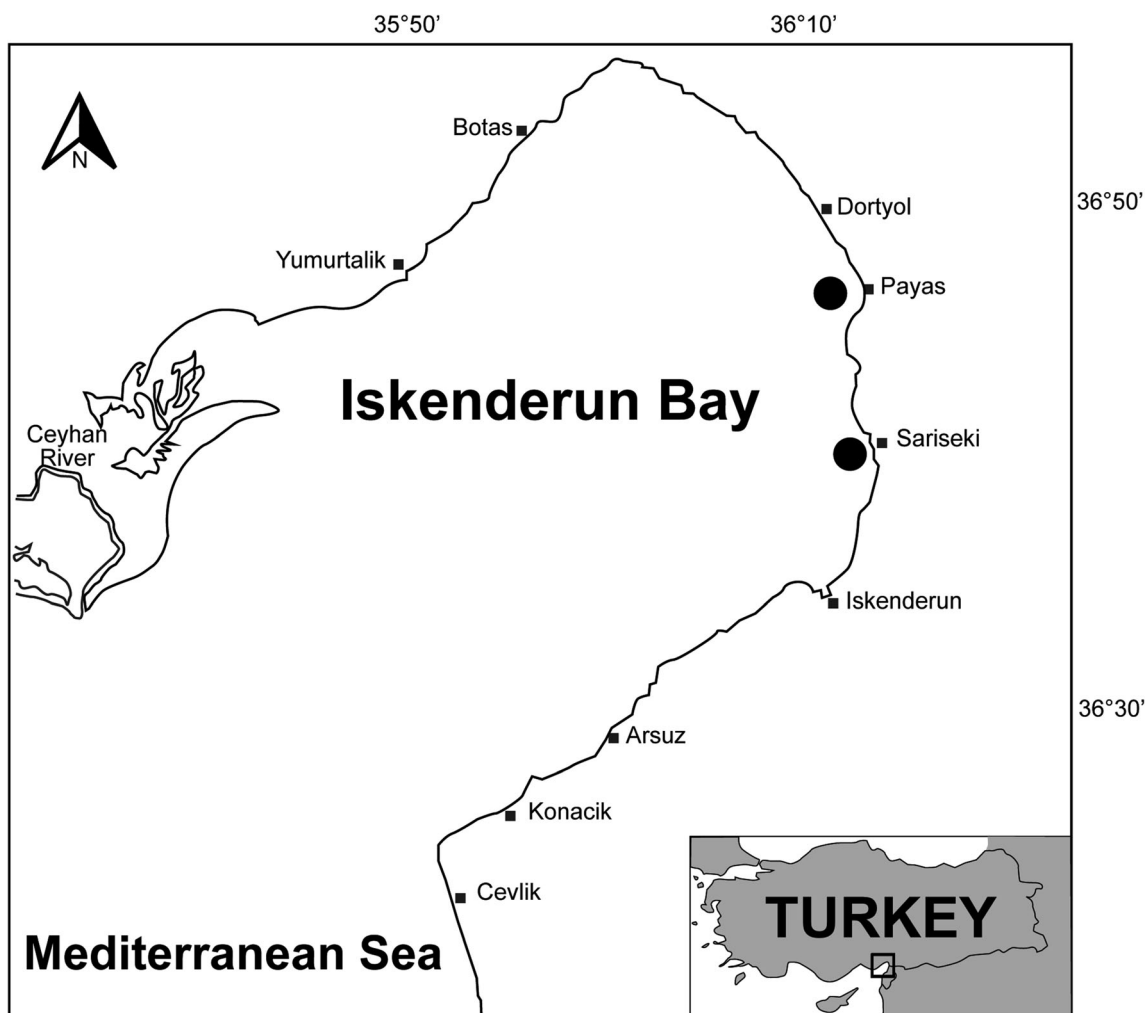
Iskenderun Bay is located in the northeastern region of the Eastern Mediterranean Sea, about 65 km long and 35 km wide and maximum depth is approximately 100 m in the entrance to the Mediterranean Sea. The average depth is 70 m (Avşar 1999), and it is known to have the largest continental shelf area after the Nile Delta in the Eastern Mediterranean Sea.

Two specimens of the slender sunfish were recorded from two locations at a depth between 0 and 24 m from Iskenderun Bay (Fig. 1). A female specimen (Fig. 2) was caught in purse seine net during a benthic survey at a depth of 24 m on 20 April 2016 from Iskenderun coast (coordinate; lat 36°39'N, long 36°11'E) and a male specimen (Fig. 3) was caught in a



**Fig. 2** The female specimen of *Ranzania laevis* from Iskenderun Bay (northeastern Mediterranean Sea), Turkey

gill net at sea surface in Payas coast on 08 May 2018 (Coordinate; lat 36°48'N, long 36°10'E) (Fig. 1). Captured fresh specimens were placed on crushed ice and transported to the laboratory for more detailed examination. Sex was determined by macroscopic examination of the gonad. Then,



**Fig. 1** Map of capture site (black dot) of *Ranzania laevis* from Iskenderun Bay (northeastern Mediterranean Sea), Turkey

**Fig. 3** The male specimen of *Ranzania laevis* from Payas coast (Iskenderun Bay, Turkey)



specimens were preserved in 4% formalin prior to deposition in the Museum of the Faculty of Marine Sciences and Technology, Iskenderun Technical University, Iskenderun-Hatay. MSM-PIS/2016-9 and MSM-PIS/2018-4 catalogue numbers were given to the specimens. All morphometric measurements were taken to the nearest 0.1 cm using calipers.

## Results

Two specimens of *R. laevis* were studied. The first specimen was a female and the second one was a male. The size of the female specimen is 565 mm (TL), and it weighs 4450 g, and the male specimen of *R. laevis* is 375 mm in total length (TL) and weighs 1750 g. Morphological features including measurements, counts, and color of two specimens agree with previous descriptions made by Fraser-Brunner (1951), Tortonese (1990), and Jawad et al. (2010). The specimens have a vertically elongated body; funnel-shaped mouth, very smooth skin covered in tiny hexagonal scutes, long pectoral fin, and the ornamentation pattern on the head (Abu El-Regal and El-Moselhy 2013). Gill openings are small and located just before pectorals; gill rakers are not covered with skin; pectorals are long and pointed; no pelvic; dorsal fin has 17 rays; anal fin has 17 rays; pectoral fin has 13 rays; and clavus fin has 19 rays for female specimen whereas counts indicated that male has 18 anal fin rays and 18 clavus fin rays as different from the female. The tail base is absent in both specimens; dorsal and anal fins, used for locomotion, are long and high, and symmetrical at the rear of the body; the tail fin is oblique without rear extension.

Color of the specimens: slender sunfish specimens were observed as dark blue dorsally; brilliant silvery on the sides and belly. Anterior half of the specimens had vertical stripes. Posterior half included blue, grey, brown, or green spots. There is a brownish patch below the dorsal fin narrowing towards the anal fin. These features are clear distinguishing characters of the species (Abu El-Regal and El-Moselhy 2013). Besides, slender sunfish have no spiny rays in the dorsal fins, anal fins, the caudal peduncle and caudal fins are absent and formed with a process called pseudocaudal

(clavus) formation where the posterior end of the body reduced to a leathery flap (Purushottama et al. 2014). The distinguishing meristic and morphometric characteristics of the specimens are given in Table 1 altogether. In the table, previous records were also included for the purpose of comparison.

## Discussion

The Mediterranean Sea is a dynamic ecosystem where the species diversity changes continually due to the invasion of alien species (Bianchi 2007; Golani 2010). The Mediterranean Sea as a whole constitutes the distinctive province of the Atlantic-Mediterranean warm-temperate region. According to Bianchi (2007), Mediterranean marine biodiversity is undergoing rapid alteration. Because of the increased occurrence of warm water biota, it has been claimed that the Mediterranean is under a process of tropicalization. Thus, many types of warm-water species can create populations by entering the Mediterranean Sea.

The slender sunfish has a distinctively elongated body shape and considered as poor swimmers. However, they are actually agile and fast, and sufficiently powerful to breach out of the water (Nyegaard et al. 2017). This species probably distributed to areas of high productivity, such as upwelling and convergence zones, where the presence are influenced by the prey abundance (Fitch 1969; Robinson 1975; Dulcic et al. 2007). Despite the rare occurrence of this species in the Mediterranean and Atlantic (Parenti 2003; Tortonese 1986), its populations are not considered under major threats. Therefore, it is conservationally considered in the category of “Least Concern (LC)” by the International Union for Conservation of Nature (IUCN) since 2015 (Liu et al. 2015; CITES UNEP-WCMC 2017; IUCN 2018).

This species is reported from New Zealand (Phillipps 1942), Red Sea (Abu El-Regal and El-Moselhy 2013), coastal waters of Oman and Iraqi waters of the Arabian Gulf (Jawad et al. 2010, 2011), Libyan waters in the Mediterranean (Elbaraasi and Elsalini 2010), and the Adriatic Sea (Jardas and Knezevic 1983). Maximum size of this species was reported as 900 mm

**Table 1** Morphometric measurements of *Ranzania laevis* caught from Iskenderun coast (Iskenderun Bay) compared with previous records

Authors	This study			Abu El-Regal and El-Moselhy (2013)	Elbaraasi and Elsalini (2010)	Jawad et al. (2010)	Jawad et al. (2011)	Jardas and Knezevic (1983)	Phillipps (1942)
Location	N.E. Mediterranean			Red sea	Southern Medit.	Oman Sea	Iraq waters	Adriatic Sea	New Zealand
<i>n</i>	1	1	1	1	1	2	2	2	1
Morphometric Characters and ratios (%)	Value (mm)								
Total length (TL)	565	375	600	355	–	507–495	530–523	560–420	374
Standard length (%TL)	511 (90.4)	355 (94.6)	540 (90.0)	–	–	470–470 (92.7–94.9)	483–475 (91.1–90.8)	528–490 (94.3–92.5)	–
Head length (%TL)	201 (35.5)	139 (37.0)	210 (35.0)	–	–	186–168 (36.7–33.9)	198–195 (37.4–37.3)	193–152 (36.8–34.3)	142 (37.9)
Body depth (%TL)	285 (50.4)	161 (42.9)	250 (41.7)	–	–	230–250 (45.–50.5)	260–250 (49.1–47.8)	280–168 (50.0–38.6)	152 (40.6)
Anal fin length (%TL)	135 (23.9)	90 (24.0)	150 (25.0)	–	–	130–110 (25.8–22.2)	142–140 (26.8–26.7)	137 (25.8)	84 (22.5)
Dorsal fin length (%TL)	172 (30.4)	95 (25.3)	170 (28.3)	–	–	129–127 (25.6–25.7)	105–100 (19.8–19.1)	160–130 (28.6–24.5)	89 (23.8)
Pectoral fin length (%TL)	140 (24.7)	66 (17.6)	130 (21.7)	–	–	106–102 (20.9–20.6)	168–165 (31.7–31.5)	110–103 (19.6–24.5)	66 (17.6)
Clavus length (%TL)	180 (31.8)	105 (28.0)	220 (36.6)	–	–	182–170 (33.5–36.8)	180–180 (34.0–34.4)	–	104 (27.8)
Pre-dorsal length (%TL)	440 (77.8)	330 (88.0)	510 (85.0)	–	–	450–443 (88.8–89.5)	438–430 (82.6–82.2)	496–385 (88.6–91.7)	–
Pre-pectoral length (%TL)	220 (38.9)	140 (37.3)	245 (40.8)	–	–	190–185 (31.8–37.3)	203–200 (38.3–38.2)	220–200 (39.3–37.7)	–
Pre-anus length (%TL)	403 (71.3)	265 (70.6)	–	–	–	356–370 (70.2–74.7)	386–380 (72.8–72.6)	400–325 (77.4–76.9)	–
Pre-anal length (%TL)	460 (81.4)	309 (82.4)	507 (84.5)	–	–	418–379 (82.9–76.6)	441–410 (83.2–78.4)	–	–
Eye diameter (Horizontal) (%HL)	32 (1.60)	22 (1.58)	30 (14.3)	–	–	30–28 (17.9–16.1)	27–26 (13.6–13.3)	35–25 (18.1–13.4)	–
Pre-orbital (%HL)	76 (37.8)	50 (35.9)	–	–	–	70–67 (37.6–39.9)	–	73–55 (38.5–35.0)	–
Post-orbital (%HL)	112 (55.7)	74 (53.2)	–	–	–	–	–	–	–
Inter-orbital distance (%HL)	62 (30.8)	41 (29.5)	–	–	–	59–50 (31.9–25.8)	–	–	–
Dorsal fin base (%DFL)	71 (41.3)	42 (44.2)	–	–	–	52–57 (40.3–44.8)	–	70–45 (43.8–34.6)	–
Pectoral fin base (%PFL)	32 (22.9)	17 (25.8)	–	–	–	24–26 (22.6–25.5)	–	30–27 (27.3–26.2)	–
Anal fin base (%AFL)	68 (37.7)	38 (36.1)	–	–	–	48–62 (36.9–56.4)	–	45 (32.8)	–
Weight (g)	4450	1750	3200	1295	–	3450–3700	–	–	–
Gonad weight (g)	110.9	–	62.4	–	–	–	–	–	–
Meristic characters									
Anal fin ray	18	17	18	17	–	18–17	–	17–18	–
Pectoral fin ray	13	13	13	13	–	14–12	–	13–14	–
Dorsal fin ray	17	17	18	18	–	17–15	–	18–20	–
Clavus fin ray	19	18	–	–	–	19–18	–	17–19	–

in total length (TL) by Hutchins (2001). Nevertheless, the reports indicated that the size range of the species is usually between 355 and 600 ml in TL (Table 1). The sizes of two *R. laevis* specimens presented in this study were 375 and 565 mm in TL for male and female, respectively. Although the morphological characters and ratios for the species inhabiting different locations in the world are similar, only two specimens from Iraqi waters represented clear differences in the length of dorsal fins, ranging 23.8–30.4% of TL, and pectoral fins, ranging 17.6–24.7% of TL (Table 1). Compare to the rest, the specimens from Iraqi waters had shorter dorsal fins (19.1 and 19.8%) and elongated pectoral fins (31.5 and 31.7%). The body depth of two Mediterranean specimens was found as 50.4 and 42.9% of the total length which are in the range (38.6–50.5%) of the references (Table 1).

The gender of the specimens was determined by macroscopic investigation of gonads, and their developmental stage was determined according to the scheme of Laevastu (1965). Smith et al. (2010) suggested that *R. laevis* attain maturity at a total length of approximately 300 mm. Fish > 300 mm were considered as adults, whereas individuals < 300 mm were juveniles or of indeterminate sex (Sherman 1961; Fitch 1969; Robinson 1975; Jardas and Knezevic 1983; Iddison 2002). Although the gonad development of the male was at stage 1, immature, the female specimen was found to be at stage 3 of sexually mature meaning that the ovary was developing. Smith et al. (2010) have reported stage 2 and stage 3 gonad development for *R. laevis* from the southern coast of Western Australia.

Smith et al. (2010) reported that the predominant diet of *R. laevis* is seagrass (*Posidonia sinuosa* and *P. australis*) in the southern coast of Western Australia. However, Nyegaard et al. (2017), as a result of an investigation of a female slender sunfish off Queensland, Australia coast, indicated that squid is also included in the diet of the species. According to comprehensive diet studies on *R. laevis*, the smaller specimens (10–11 cm, TL) had consumed small pelagic crustaceans (calanoid and cyclopoid copepods), as well as ostracods and amphipods (Robinson 1975). The larger specimens (26–60 cm, TL) had also fed on crustaceans (such as free-swimming megalopa and zoea stages of crabs), pteropods and fish larvae, as well as small fishes, seagrass, and squid (Fitch 1969; Smith et al. 2010; Nyegaard et al. 2017). Additionally, Bakenhaster and Knight-Gray (2016) have provided new diet data for *Mola mola* and *Masturus lanceolatus*, belonging to the same family. The report indicated that the taxon feeds on filamentous brown algae in shallow waters whereas the record of solid prey items (small fish and various invertebrates, indicative of both benthic and pelagic foraging from the guts) is only made for adult *M. lanceolatus*. The stomach content of the specimens reported in this paper was difficult to identify since the digestion was well on the way and the stomach was almost empty.

The presence of slender sunfish *R. laevis* in the Mediterranean Sea has been confirmed in the western and

central Mediterranean and the Aegean Sea as well as the Red Sea (Jardas and Knezevic 1983; Elbaraasi and Elsalini 2010; Abu El-Regal and El-Moselhy 2013) up to now. However, the presence of this species in the Northeastern Mediterranean has only been reported in a checklist produced by Bilecenoğlu et al. (2014) where the data is deficient (DD). Our finding from Iskenderun Bay is the first occurrence, hence the confirmation, of this species in the Northeastern Mediterranean coast of Turkey. The data presented here are important in terms of the current status of the species, the state of population formation as well as biodiversity in the region.

The slender sunfish prefers water temperatures between 14.7 and 27.9 °C with a mean of 23.9 °C (Kaschner et al. 2016) and was generally reported from waters at around 20 °C (Robinson 1975; Solokovskaya and Sokolovskiy 1975; Castro and Ramos 2002; Wan and Zhang 2005). The sea surface temperature (SST) in April and May was between 19.3 and 21.4 °C in 2016 and between 19.3 and 22.6 °C in 2018 in Iskenderun Bay, Turkey, located along the Northeastern Mediterranean (MGM 2018). The regional sea surface temperature was 20.4 and 20.9 °C when the specimens were collected in 2016 and in 2018, respectively. These findings show similarities with previous studies (Castro and Ramos 2002; Wan and Zhang 2005; Jawad et al. 2010).

Although several factors may be effective in the presence of the slender sunfish in the Eastern Mediterranean Sea coast of Turkey (Iskenderun Bay), the most probable reason is the rise in the sea surface temperature in the Mediterranean Sea (Turan et al. 2016). Castro and Ramos (2002) have also related the presence of *R. laevis* off Gran Canaria (Canary Islands) with a sudden rise in sea surface water temperature due to sudden west-east warming process of the sea surface in the central Atlantic. Jawad et al. (2010) claimed that southern warming process of the sea surface in the Oman Sea promotes further northern movement of the species from its native habitats. *R. laevis* may also be following its prey northerly due to press range expansion in Libyan waters in southern Mediterranean (Elbaraasi and Elsalini 2010).

Local warming of seawater in the Eastern Mediterranean Sea, especially for Iskenderun Bay, might have been crucial in facilitating the proliferation of warm water species (Turan et al. 2016). Moreover, increase in the number of zooplankton and small pelagic fish, which are the main food for *R. laevis* (Dulcic and Grbec 2000; Castro and Ramos 2002; Jawad et al. 2010), may also have a considerable contribution in the occurrence of the species in the region.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** There is no ethical issue concerning this article.

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